

Experimentelle Elementarteilchenphysik

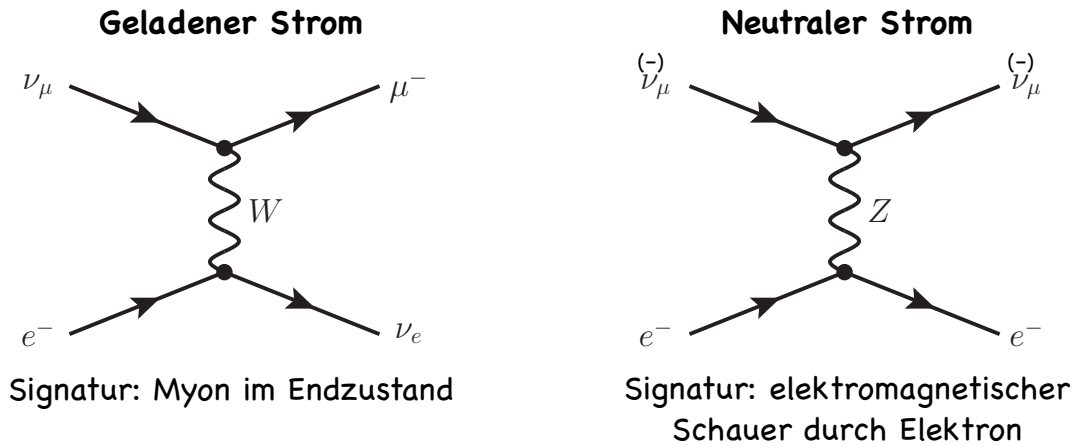
Ulrich Husemann
Humboldt-Universität zu Berlin
Sommersemester 2009

Die Gargamelle-Blasenkammer



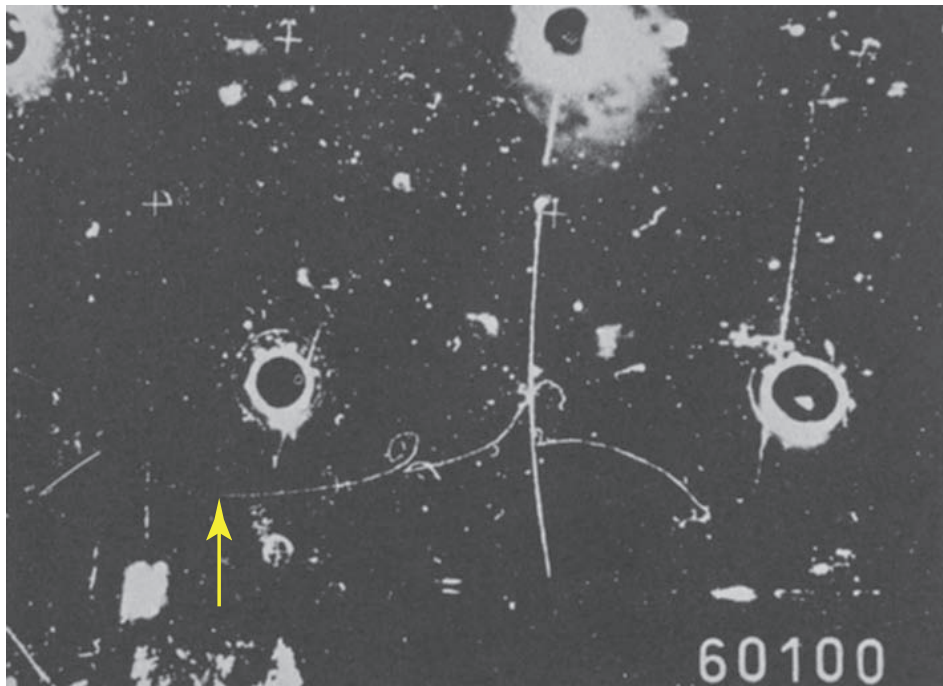
[CERN]

Neutrino-Elektron-Streuung



Exp. Elementarteilchenphysik (P23.1.1), HU Berlin, Sommersemester 2009, 5. Vorlesung 3

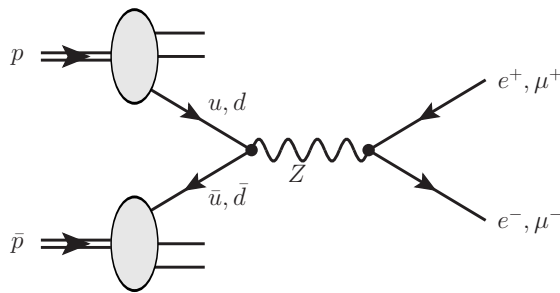
Neutraler Strom in Gargamelle



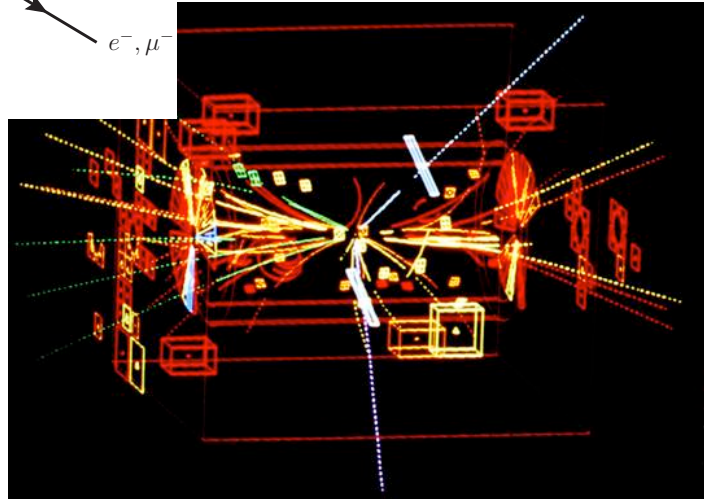
[F. J. Hasert et al., Phys. Lett. **B46** (1973), 121]

Exp. Elementarteilchenphysik (P23.1.1), HU Berlin, Sommersemester 2009, 5. Vorlesung 4

Z-Entdeckung bei UA1 und UA2

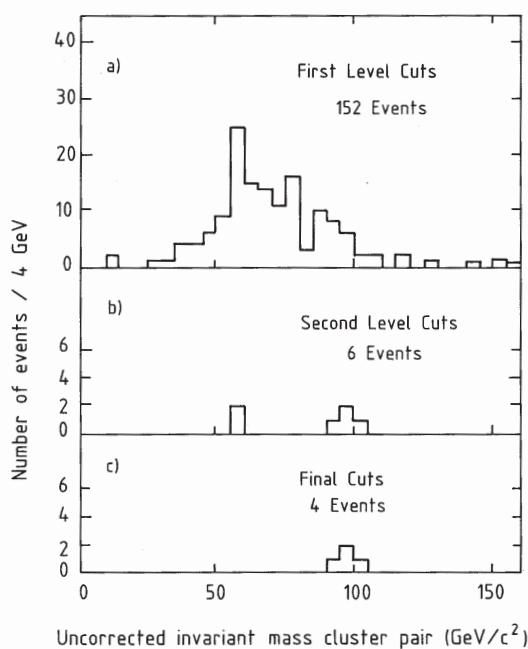


[<http://cdsweb.cern.ch>]



Exp. Elementarteilchenphysik (P23.1.1), HU Berlin, Sommersemester 2009, 5. Vorlesung 5

Z-Entdeckung bei UA1 und UA2



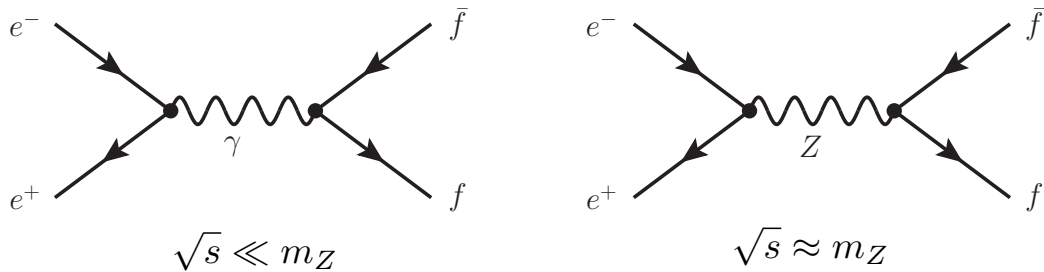
Identifikation über invariante Masse eines Leptonpaares:

$$m_Z^2 = m_{\ell^+\ell^-}^2 = (p_{\ell^+} + p_{\ell^-})^2$$

[G. Arnison et al., Phys. Lett. **B126** (1983), 398]

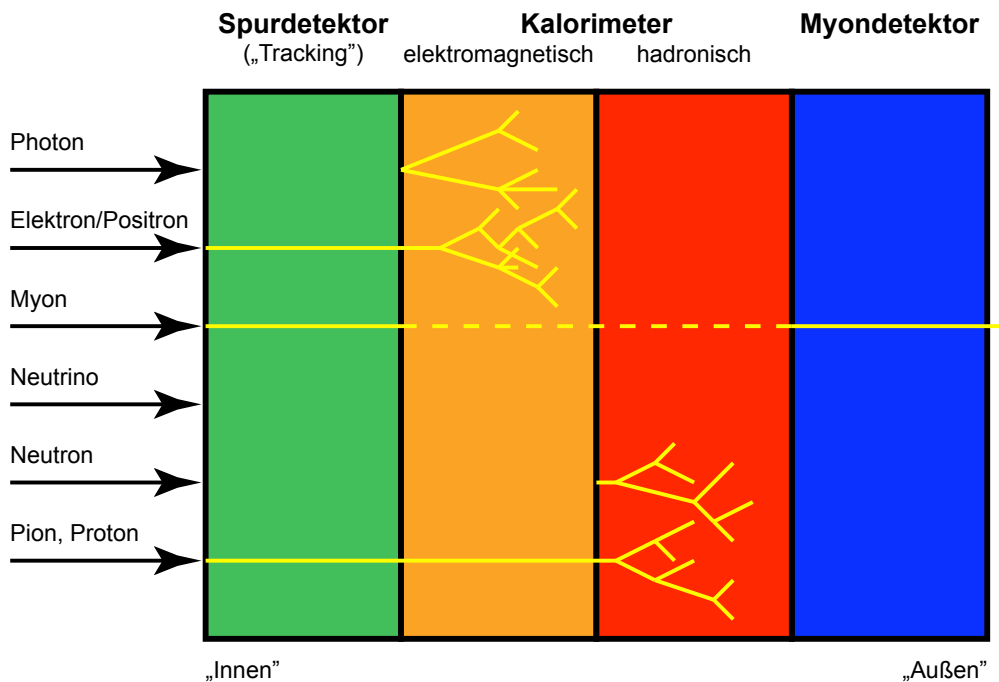
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e^+e^- -Streuung



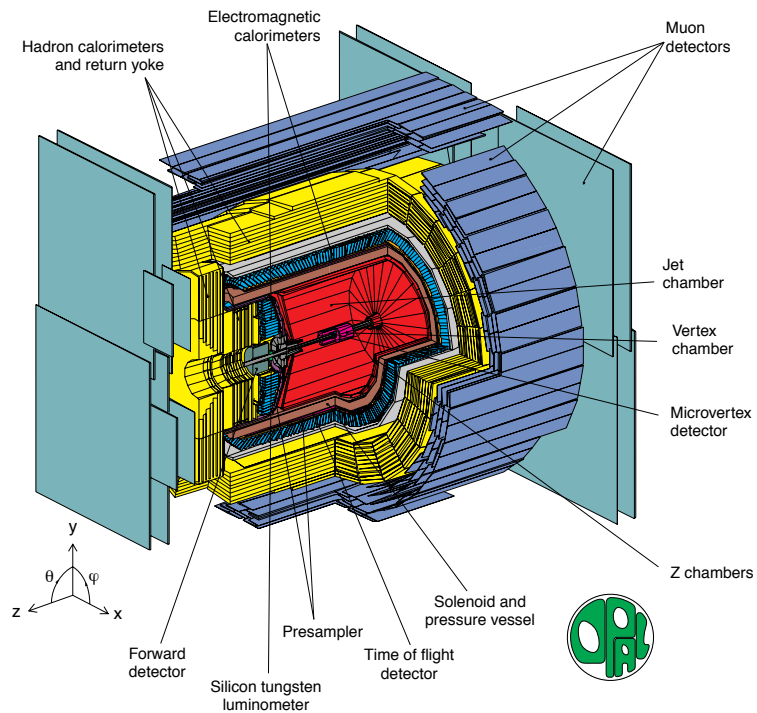
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Teilchendetektor (schematisch)



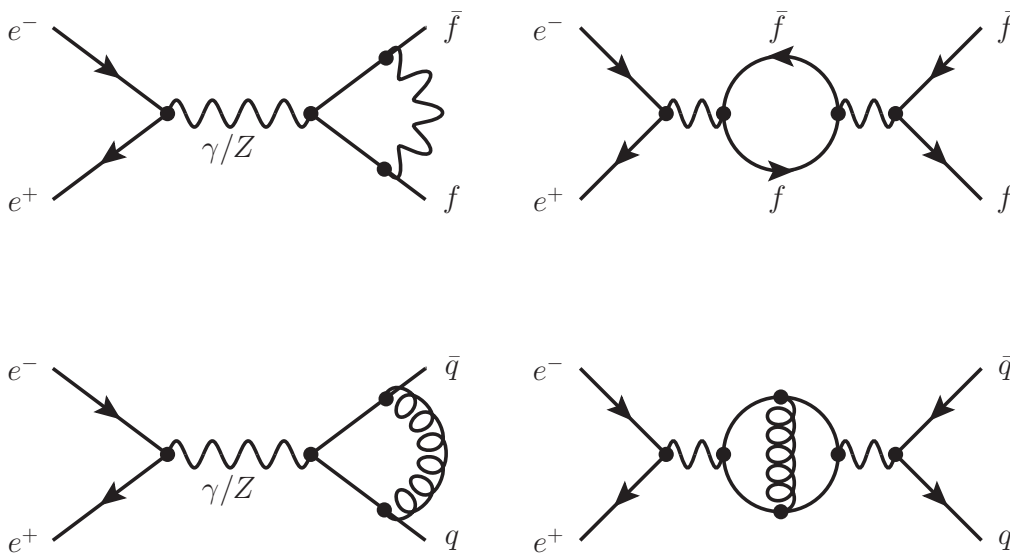
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Der OPAL-Detektor bei LEP

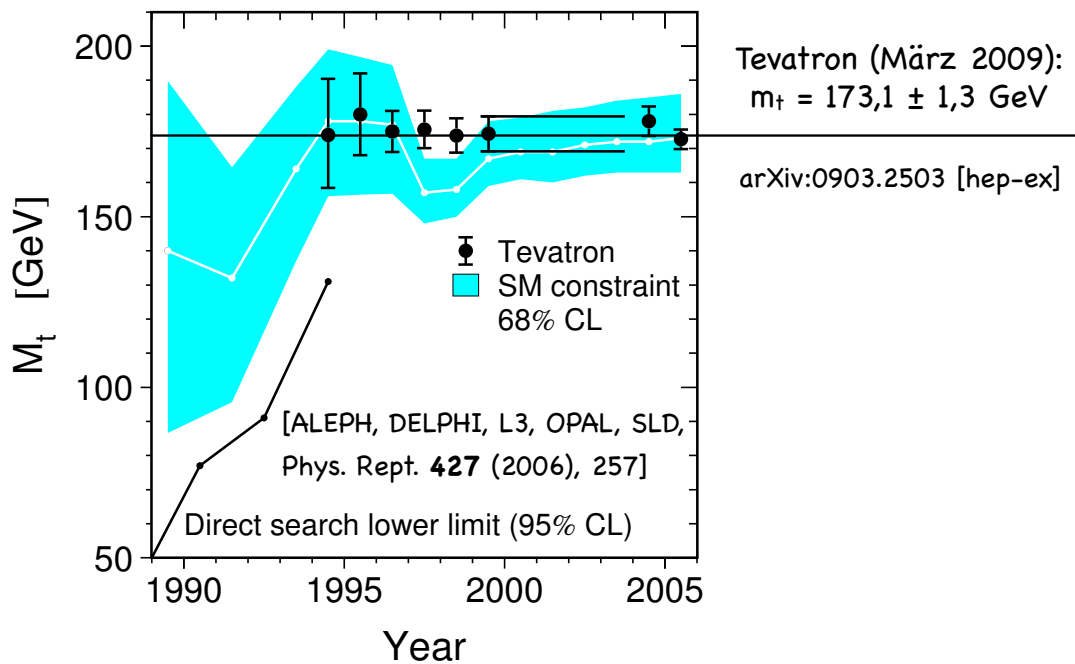


[<http://opal.web.cern.ch/Opal/>]

Beispiele Strahlungskorrekturen

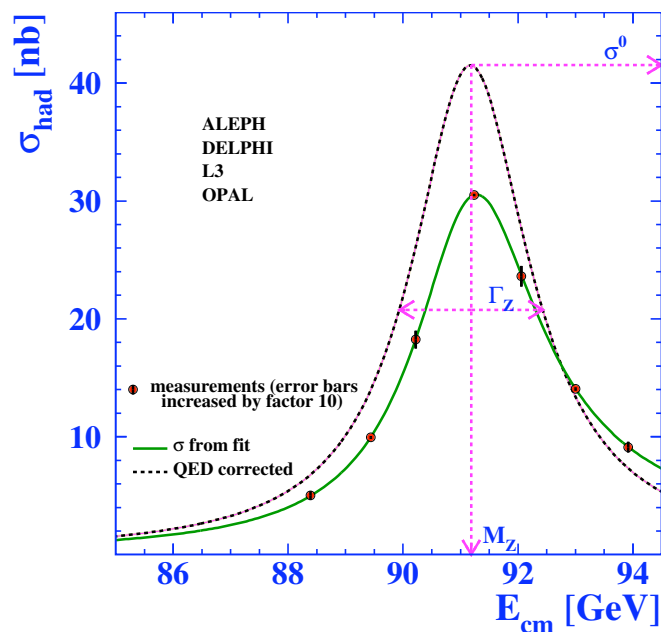


Vorhersage Top-Quark-Masse



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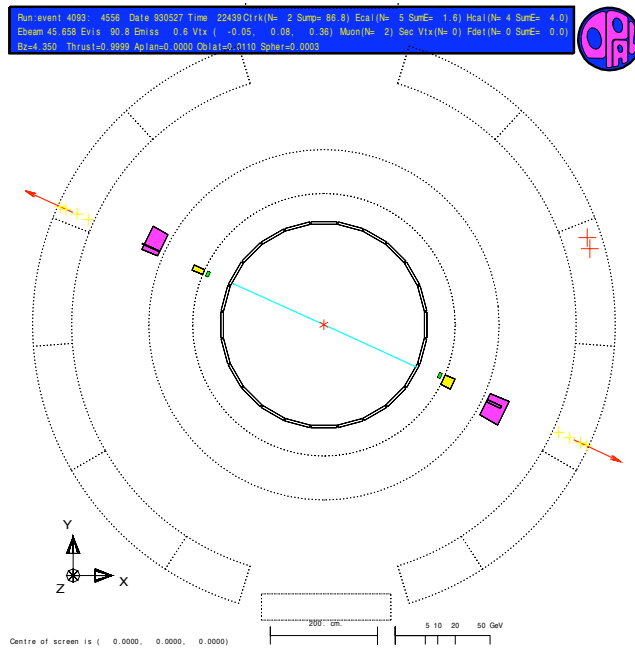
Z-Resonanz: σ_{had}



[ALEPH, DELPHI, L3, OPAL, SLD, Phys. Rept. 427 (2006), 257]

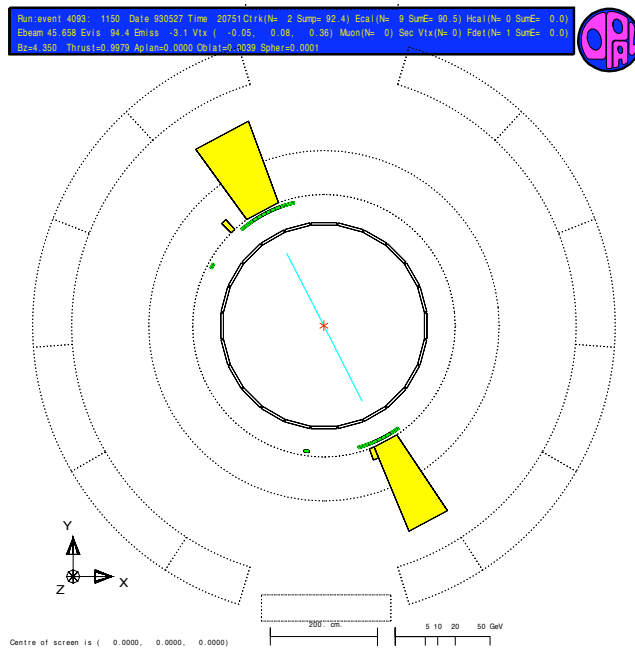
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LEP-I: $Z \rightarrow \mu^+ \mu^-$



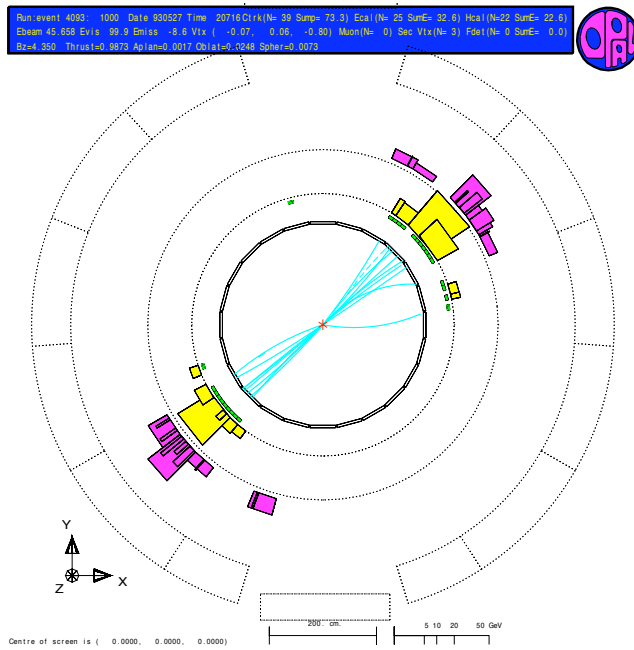
[<http://opal.web.cern.ch/Opal/events/opalpics.html>]

LEP-I: $Z \rightarrow e^+ e^-$



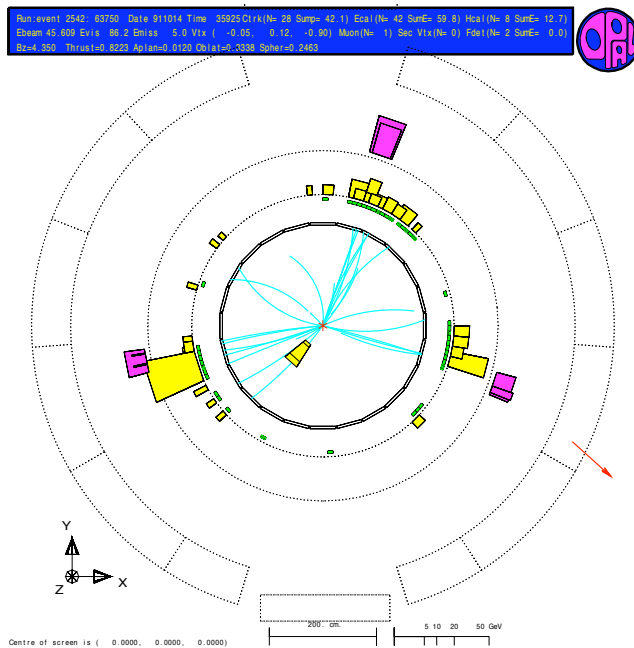
[<http://opal.web.cern.ch/Opal/events/opalpics.html>]

LEP-I: $Z \rightarrow qq$



[<http://opal.web.cern.ch/Opal/events/opalpics.html>]

LEP-I: $Z \rightarrow qqg$



[<http://opal.web.cern.ch/Opal/events/opalpics.html>]